

AMENDMENTS TO THE CLAIMS

Claims 1-17 (Canceled)

Claim 18 (Currently Amended) A speaker device comprising:

a housing having an opening portion;

a vibration system member vibrating to generate sound;

a support system member connected to said housing and for supporting said vibration system member in a manner which allows said vibration system member to vibrate;

a first magnetic circuit disposed inside said housing and having a first magnet provided on a surface thereof facing the opening portion, and a first yoke provided lateral to the first magnet; and

a second magnetic circuit having a second magnet disposed facing the first magnet of said first magnetic circuit via a first magnetic gap, and a second yoke provided lateral to the second magnet,

wherein a second magnetic gap is formed in at least one of an interval between a side surface of the first magnet and the first yoke in said first magnetic circuit and an interval between a side surface of the second magnet and the second yoke in said second magnetic circuit,

said vibration system member includes:

a first voice coil;

a first voice coil bobbin provided to dispose the first voice coil in the second magnetic gap; and

a diaphragm including a magnetic member, the magnetic member being made of a magnetic material other than a magnet, and being connected directly or indirectly to the first voice coil bobbin and so that the magnetic member is being disposed in the first magnetic gap between the first magnet of said first magnetic circuit and the second magnet of said second magnetic circuit, wherein

when said vibration system member is displaced to said first magnetic circuit from a balanced position, the magnetic member receives a repelling-pulling force in a direction which

causes the magnetic member to travel away from the ~~balance~~balanced position by the magnetic field formed by said first ~~and second magnetic circuits~~ circuit and

when said vibration system member is displaced to said second magnetic circuit from a balanced position, the magnetic member receives a pulling force in a direction which causes the magnetic member to travel away from the balanced position by the magnetic field formed by said second magnetic circuit.

Claim 19 (Currently Amended) The speaker device according to claim 18, wherein
said vibration system member further includes a diaphragm at least a portion of
~~which is composed of the magnetic member,~~
the first voice coil bobbin is fixed to the diaphragm, and
said support system member supports the diaphragm in the first magnetic gap in a
manner which allows the diaphragm to vibrate.

Claim 20 (Currently Amended) The speaker device according to claim 18, wherein
said second magnetic circuit further includes:
a magnetic plate fixed to a surface facing the opening portion of the second
magnet,
the second yoke is disposed lateral to the second magnet and the magnetic plate,
and forms the second magnetic gap between the second magnet and a side surface of the
magnetic plate,
said ~~vibration system member further includes a diaphragm is disposed,~~disposed
so as to face ~~facing~~ a surface facing the opening portion of said housing of said second magnetic
circuit,
the first voice coil bobbin connects the diaphragm and the magnetic member via
the second magnetic gap formed in ~~the said~~ second magnetic circuit, and
the first voice coil is disposed in the second magnetic gap formed in ~~the said~~
second magnetic circuit.

Claim 21 (Previously Presented) The speaker device according to claim 20, wherein
said first magnetic circuit further includes a magnetic plate fixed to a surface
facing inside of said housing of the first magnet,
the first yoke is disposed lateral to the first magnet and the magnetic plate, and
forms the second magnetic gap between the first magnet and a side surface of the magnet plate,
and
said vibration system member further includes:
a second voice coil; and
a second voice coil bobbin fixed to the magnetic member and for disposing
the second voice coil in the second magnetic gap formed in said first magnetic circuit.

Claim 22 (Currently Amended) The speaker device according to claim 18, wherein
said second magnetic circuit further includes:
a magnetic plate fixed to a surface facing the opening portion of the second
magnet,
the second yoke is disposed lateral to the second magnet and the magnetic plate,
and forms the second magnetic gap between the second magnet and a side surface of the
magnetic plate,
said vibration system member further includes:
~~a diaphragm disposed, facing a surface facing the opening portion of said~~
~~housing of said second magnetic circuit; and~~
a connection member for connecting the diaphragm and the magnetic member via
the second magnetic gap formed in the second magnetic circuit, ~~and~~
said diaphragm is disposed so as to face a surface facing the opening portion of
said housing of said second magnetic circuit, and
the first voice coil bobbin disposes the first voice coil in the second magnetic gap
formed in said first magnetic circuit.

Claim 23 (Previously Presented) The speaker device according to claim 18, wherein
said first and second magnetic circuits have the same structure, and
said second magnetic circuit and said first magnetic circuit are arranged
symmetrically about the magnetic member.

Claim 24 (Previously Presented) The speaker device according to claim 23, wherein
said vibration system member further includes:
a second voice coil; and
a second voice coil bobbin connected directly or indirectly to the magnetic
member and for disposing the second voice coil in the second magnetic gap formed in said first
magnetic circuit,
the first voice coil bobbin disposes the first voice coil in the second magnetic gap
formed in the second magnetic circuit.

Claim 25 (Previously Presented) The speaker device according to claim 18, wherein
said first magnetic circuit further includes:
a magnetic plate fixed to a surface facing inside of said housing of the first
magnet; and
a third magnet fixed to a surface facing inside of said housing of the
magnetic plate, and
the first yoke is provided to form the second magnetic gap between the first yoke
and a side surface of the magnetic plate, and
the first magnet and the third magnet are magnetized in directions opposite to each
other, the directions being vibration directions of said vibration system member.

Claim 26 (Previously Presented) The speaker device according to claim 18, wherein
said second magnetic circuit further includes:

a magnetic plate fixed to a surface facing the opening portion of said housing of the second magnet; and

a third magnet fixed to a surface facing the opening portion of said housing of the magnetic plate, and

the second yoke is provided to form the second magnetic gap between the second yoke and a side surface of the magnetic plate, and

the second magnet and the third magnet are magnetized in directions opposite to each other, the directions being vibration directions of said vibration system member.

Claim 27 (Previously Presented) The speaker device according to claim 18, wherein said first magnetic circuit further includes:

a magnetic plate fixed to a surface facing inside of said housing of the first magnet,

the first yoke is provided to form the second magnetic gap between the first yoke and a side surface of the magnetic plate, and

the first magnet is magnetized in a vibration direction of said vibration system member.

Claim 28 (Presented Presented) The speaker device according to claim 18, wherein said second magnetic circuit includes:

a magnetic plate fixed to a surface facing the opening portion of the second magnet,

the second yoke is provided to form the second magnetic gap between the second yoke and a side surface of the magnetic plate, and

the second magnet is magnetized in a vibration direction of said vibration system member.

Claim 29 (Currently Amended) The speaker device according to claim 18, where

the speaker device comprises a plurality of magnetic circuit units each composed of said first and second magnetic circuits,

said vibration system member includes:

a same number of the first voice coils as a number of magnetic circuit units;

and

a same number of the first voice coil bobbins as the number of magnetic circuit units, each first voice coil being disposed in a corresponding second magnetic gap of the corresponding magnetic circuit ~~unit~~, unit, and

~~a said diaphragm is fixed to each first voice coil bobbin and at least a portion of which is composed of a the magnetic member.~~

Claim 30 (Previously Presented) The speaker device according to claim 18, further comprising:

a position detecting section for detecting a position of said vibration system member; and

a control section for controlling a vibration of said vibration system member by applying to the first voice coil a signal obtained by adding a direct current component to an acoustic signal based on the position of said vibration system member detected by the position detecting section so that a center of an amplitude of the magnetic member is at a balanced position of a magnetic field formed in the first magnetic gap.

Claim 31 (Previously Presented) The speaker device according to claim 30, wherein the position detecting section is a laser displacement gauge.

Claim 32 (Previously Presented) The speaker device according to claim 18, further comprising:

a frame fixed to said support system member,

wherein a speaker unit composed of said vibration system member, said support

system member, said first and second magnetic circuits, and the frame, is attached to the opening portion by the frame being fixed to the opening portion.

Claim 33 (Previously Presented) A car comprising:
the speaker device according to claim 18; and
a car body inside which the speaker device is disposed.

Claim 34 (Previously Presented) A video device comprising:
the speaker device according to claim 18; and
a device housing inside which the speaker device is disposed.